1. Predicted Cost of Fatalities = PC × P(FC|C) × (Average Number of Fatalities Observed In Fatal Collisions) × $3 million
2. Predicted Cost of Injuries = PC × (P(CC|C)—P(FC|C)) × (Average Number of Injuries in Collisions Involving Injuries) × $1,167,000

PC, P(CC|C), and P(FC|C) are direct outputs of the DOT prediction formulas.

(b) The average number of fatalities observed in fatal collisions and the average number of injuries in collisions involving injuries are calculated by FRA as described in paragraphs (c) through (e).

(c) FRA will match the highway-rail incident files for the past five years against a data file containing the list of grade crossings where the train horn was not routinely sounded over that five-year period to identify two types of collisions involving trains and motor vehicles: (1) Those that occurred at crossings where the train horn was not routinely sounded during the period, and (2) those that occurred at crossings equipped with automatic gates where the train horn was routinely sounded. Certain records will be excluded, including records pertaining to incidents where the driver was not in the motor vehicle or where the motor vehicle struck the train beyond the fourth locomotive or rail car that entered the crossing. FRA believes that sounding the train horn would not be very effective at preventing such incidents.[1]

(d) Collisions in the group containing the gated crossings nationwide where horns were routinely sounded will then be identified as fatal, injury only or no casualty. Collisions will be identified as fatal if one or more deaths occurred, regardless of whether injuries were also sustained. Collisions will be identified as injury only when injuries, but no fatalities, resulted.

(e) The collisions (incidents) will be summarized by year for the five-year period preceding the year in which the risk index is being updated. The fatality rate for each year will be calculated by dividing the number of fatalities by the number of fatal incidents. The injury rate will be calculated by dividing the number of injuries in injury only incidents by the number of injury only incidents. FRA will publish updated fatality and injury rates on an annual basis in the FEDERAL REGISTER.

(f) Per guidance from DOT, $3 million is the value placed on preventing a fatality. The Abbreviated Injury Scale (AIS) developed by the Association for the Advancement of Automotive Medicine categorizes injuries into six levels of severity. Each AIS level is assigned a value of injury avoidance as a fraction of the value of avoiding a fatality . FRA rates collisions that occur at train speeds in excess of 25 mph as an AIS level 5 ($2,287,500) and injuries that result from collisions involving trains traveling under 25 mph as an AIS level 2 ($46,500). About half of grade crossing collisions occur at speeds greater than 25 mph. Therefore, FRA estimates that the value of preventing the average injury resulting from a grade crossing collision is $1,167,000 (the average of an AIS–5 injury and an AIS–2 injury).

(g) Notice that the quantity [PC*P(FC|C)] represents the expected number of fatal collisions. Similarly, {PC*[P(CC|C)–P(FC|C)]} represents the expected number of injury collisions. These are then multiplied by their respective average number of fatalities and injuries (from the table above) to develop the number of expected casualties. The final parts of the expressions attach the dollar values for these casualties.

(h) The Risk Index for a Crossing is the integer sum of the Predicted Cost of Fatalities and the Predicted Cost of Injuries.

NATIONWIDE SIGNIFICANT RISK THRESHOLD

The Nationwide Significant Risk Threshold is simply an average of the risk indexes for all of the gated public crossings nationwide where train horns are routinely sounded. This value will be recalculated annually and published in a notice in the FEDERAL REGISTER. For the most recent value of the Nationwide Significant Risk Threshold, please visit FRA's public Web site at *http://www.fra.dot.gov*.

CROSSING CORRIDOR RISK INDEX

The Crossing Corridor Risk Index is the average of the risk indexes of all the public crossings in a defined rail corridor.

QUIET ZONE RISK INDEX

The Quiet Zone Risk Index is the average of the risk indexes of all the public crossings in a Quiet Zone. It takes into consideration the absence of the horn sound and any safety measures that may have been installed.

[71 FR 47634, Aug. 17, 2006, as amended at 72 FR 44792, Aug. 9, 2007]

APPENDIX E TO PART 222—REQUIREMENTS FOR WAYSIDE HORNS

This appendix sets forth the following minimum requirements for wayside horn use at highway-rail grade crossings:

1. Highway-rail crossing must be equipped with constant warning time device, if reasonably practical, and power-out indicator;

[1] The data used to make these exclusions is contained in blocks 18—Position of Car Unit in Train; 19—Circumstance: Rail Equipment Struck/Struck by Highway User; 28—Number of Locomotive Units; and 29—Number of Cars on the current FRA Form 6180–57 Highway-Rail Grade Crossing Accident/Incident Report.

2. Horn system must be equipped with an indicator or other system to notify the locomotive engineer as to whether the wayside horn is operating as intended in sufficient time to enable the locomotive engineer to sound the locomotive horn for at least 15 seconds prior to arrival at the crossing in the event the wayside horn is not operating as intended;

3. The railroad must adopt an operating rule, bulletin or special instruction requiring that the train horn be sounded if the wayside horn indicator is not visible approaching the crossing or if the wayside horn indicator, or an equivalent system, indicates that the system is not operating as intended;

4. Horn system must provide a minimum sound level of 92 dB(A) and a maximum of 110 dB(A) when measured 100 feet from the centerline of the nearest track;

5. Horn system must sound at a minimum of 15 seconds prior to the train's arrival at the crossing and while the lead locomotive is traveling across the crossing. It is permissible for the horn system to begin to sound simultaneously with activation of the flashing lights or descent of the crossing arm; arm

6. Horn shall be directed toward approaching traffic.

APPENDIX F TO PART 222—DIAGNOSTIC TEAM CONSIDERATIONS

For purposes of this part, a diagnostic team is a group of knowledgeable representatives of parties of interest in a highway-rail grade crossing, organized by the public authority responsible for that crossing who, using crossing safety management principles, evaluate conditions at a grade crossing to make determinations or recommendations for the public authority concerning the safety needs at that crossing. Crossings proposed for inclusion in a quiet zone should be reviewed in the field by a diagnostic team composed of railroad personnel, public safety or law enforcement, engineering personnel from the State agency responsible for grade crossing safety, and other concerned parties.

This diagnostic team, using crossing safety management principles, should evaluate conditions at a grade crossing to make determinations and recommendations concerning safety needs at that crossing. The diagnostic team can evaluate a crossing from many perspectives and can make recommendations as to what safety measures authorized by this part might be utilized to compensate for the silencing of the train horns within the proposed quiet zone.

ALL CROSSINGS WITHIN A PROPOSED QUIET ZONE

The diagnostic team should obtain and review the following information about each crossing within the proposed quiet zone:

1. Current highway traffic volumes and percent of trucks;

2. Posted speed limits on all highway approaches;

3. Maximum allowable train speeds, both passenger and freight;

4. Accident history for each crossing under consideration;

5. School bus or transit bus use at the crossing; and

6. Presence of U.S. DOT grade crossing inventory numbers clearly posted at each of the crossings in question.

The diagnostic team should obtain all inventory information for each crossing and should check, while in the field, to see that inventory information is up-to-date and accurate. Outdated inventory information should be updated as part of the quiet zone development process.

When in the field, the diagnostic team should take note of the physical characteristics of each crossing, including the following items:

1. Can any of the crossings within the proposed quiet zone be closed or consolidated with another adjacent crossing? Crossing elimination should always be the preferred alternative and it should be explored for crossings within the proposed quiet zone.

2. What is the number of lanes on each highway approach? Note the pavement condition on each approach, as well as the condition of the crossing itself.

3. Is the grade crossing surface smooth, well graded and free draining?

4. Does the alignment of the railroad tracks at the crossing create any problems for road users on the crossing? Are the tracks in superelevation (are they banked on a curve?) and does this create a conflict with the vertical alignment of the crossing roadway?

5. Note the distance to the nearest intersection or traffic signal on each approach (if within 500 feet or so of the crossing or if the signal or intersection is determined to have a potential impact on highway traffic at the crossing because of queuing or other special problems).

6. If a roadway that runs parallel to the railroad tracks is within 100 feet of the railroad tracks when it crosses an intersecting road that also crosses the tracks, the appropriate advance warning signs should be posted as shown in the MUTCD.

7. Is the posted highway speed (on each approach to the crossing) appropriate for the alignment of the roadway and the configuration of the crossing?

8. Does the vertical alignment of the crossing create the potential for a ''hump crossing'' where long, low-clearance vehicles might get stuck on the crossing?

9. What are the grade crossing warning devices in place at each crossing? Flashing lights and gates are required for each public